

FORM AND FUNCTION: Part 3 - The Head

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"There are three varieties of heads met with in the dog, together with some intermediate types ... crossing has taken place ... the consequence is that there are now in existence several hundred breeds, none of which possess heads similar in every detail."

R H Smythe

The head is the "control tower". It houses the brain, the important sensory organs (ears, eyes and nose) and the mouth. The sensory organs are the receptors of external stimuli and therefore are organs of communication. The shape and disposition of the ears, eyes and nose contribute most to the expression and identity of each animal. That in turn is largely determined by the underlying musculature and skeletal structure. The consequence is that the head and its features play a major part in establishing type in the dog.

FORM & FUNCTION

The head (excluding hyoid apparatus) is composed of 41 bones (Figure B). The brain, eyes and ears are housed in the cranium region and the mouth and nose are housed in the muzzle region. The stop, between the cranium and the muzzle overlies the frontal, nasal and maxillae bones between the eye orbits. The basic wolf-like head (mesocephalic) has a 3:2 cranium-length: muzzle-length ratio, prick ears set high and almond shaped eyes (Figures A & C).

Brain

The major bones of the brain case are the occipital, parietals, frontals, temporals, sphenoid and ethmoid. The occipital articulates with the spine (atlas), allows the spinal cord access through the foramen magnum. The frontal bone houses nasal sinuses and forms part of the orbit in which the eye is housed. The temporal bone is complex due to housing the internal ear structures.

Ears

The organs of hearing. The external ear is the structure that we see. Technically it is the pinna, a funnel-like sheet of cartilage which channels sound vibrations via the ear

canal to the eardrum. The pinnae are moved by muscles to gain the best hearing advantage. The muscles are attached to the parietal, occipital, temporal, frontal and zygomatic bones. The ear canal enters the skull through the external acoustic meatus in the temporal bones. —

Eyes

The organs of sight. The eye is set in the orbit bounded by the zygomatic arch, frontal, lacrimal and palatine bones. Externally it is protected by the eyelids and it is they which give shape to the eye. The shape of the skull and the set of the eyes allows a very wide field of vision, being a maximum of c. 270 degrees with a narrow field of binocular vision (Figure D).

Nose

The organ of smell, the external organ of the respiratory system, and an organ of perspiration. The region which is hairless (the nasal plane) is characteristically patterned with elevations and ridges; it houses the nostrils, through which the air is inhaled and exhaled, and is based on cartilages. The cartilages and associated muscles allow for a mobile region which attaches to the nasal and incisive bones. The internal nasal cavity is a complex structure housed within the muzzle and front cranial region. The olfactory nerves for smelling are housed in the internal cavity. The air is warmed, moistened and "cleaned" in the internal nasal cavity too.

Mouth (see Part 2, February 1996 Journal)

VARIATIONS

The Three varieties of heads referred to by Smythe are the mesocephalic, dolichocephalic and brachycephalic, the mesocephalic being the basic head type, c. 3:2 cranial-length: muzzle-length. The dolichocephalic head is long and narrow with a 1:1 ratio or an even longer muzzle. The brachycephalic head is short and broad with a 3:1 ratio or an even shorter muzzle. Less commonly, muzzle-length is expressed as a percentage of the total-head-length. This is known as the naso-cephalic index. Skull-width also varies proportion-

ately in the head types. This can be expressed as the total-cephalic-index: the width expressed as a percentage of the total-length of the head (Figure F).

Miniaturisation (microcephalic head) and giantism (megacephalic head) may also lead to changes. These usually are in proportion. However, extreme miniaturisation leads to inability of the structures such as the brain and eyes to be accommodated in the reduced skeletal framework. The molero sometimes found in breeds such as the Chihuahua is a fissure in the region between the frontal and parietal bones. These bones fail to accommodate the mass of the brain and cerebral fluid by ceasing to form a complete case.

All of these changes and the grades between them result in variation /compensation in the size and position of muscle attachment as the skeletal structure changes. The changes result in modifications of the shape, disposition and function of the external features.

Brain

Brain size remains relatively uniform between all breeds of dog. The cranial capacity varies somewhat and volume of cephalic fluid accounts for most of this variation. The cranial capacity of the micro and megacephalic heads is c. 11 % below and above (respectively) that of the mesocephalic head.

Ears

The ears vary from the normal highest prick ear in a number of ways: shape of the pinna, size of the pinna, strength of the cartilage of the pinna, disposition of the pinna on the skull by rotation and by setting more laterally, and in muscular control over the pinna. (Figure E) Those with pendant ears are unable to effectively expose the ear canal to sound waves. All Gundogs have pendant ears, a phenomenon which presumably provides them with some protection from the explosive impact of the sound of the gun shot. None of the giant breeds have prick ears, but the miniature breeds may have prick ears.

Eyes

The eyes vary in set and the lids in shape. The closer to brachycephalic the stronger the tendency to a round eye. The true brachycephalic dog has the eye facing more frontal so that the angle between the visual axes is reduced resulting in greater binocular vision than the others have, but a reduced total field of vision. The more miniaturised the dog the less the orbit accommodates the eyeball, hence the eye tends to protrude. In the worst exemplars the eye is prone to prolapse.

Nose

The muzzle varies in length from almost non-existent to longer than the cranium. The true brachycephalic breeds have a highly modified nasal cavity and some are prone to respiratory problems. For example veterinarians have to exercise extreme care during and after anaesthesia for these animals. The muzzle bones are greatly altered. Hence there is a bulk of soft tissue to be accommodated in the muzzle region. The result frequently is problems with skin folds, pressured nostrils, slack soft palate etc.

ASSESSING THE HEAD

If we simplistically said that there are 3 head sizes, 3 muzzle: cranium proportions and 5 ear sets then there would be 45 recognisably different heads. But there are numerous other characters such as hair type and distribution, colour, bite, eye shape and disposition, depth of stop, angle of toplines of muzzle and cranium, prominence of occiput, ear size, ear shape, flew size etc, which have to be taken into account. Hence defining the acceptable range for each quality for each breed and then defining the ideal within that range is a major part of the art/science of successful breeding and judging of dogs. Bearing in mind that the development through juvenile to adult and the difference between male and female is included in the procedure, it can be seen that assessing the head is complex.

Next Issue: **Body**

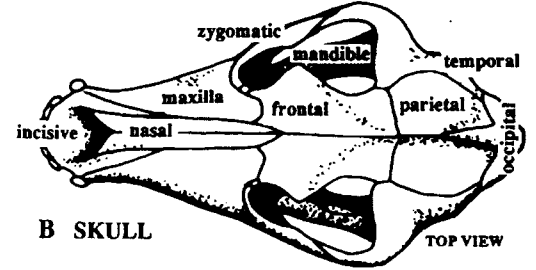
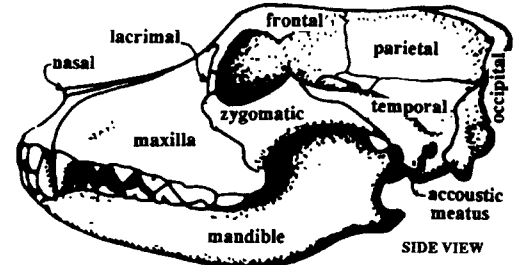
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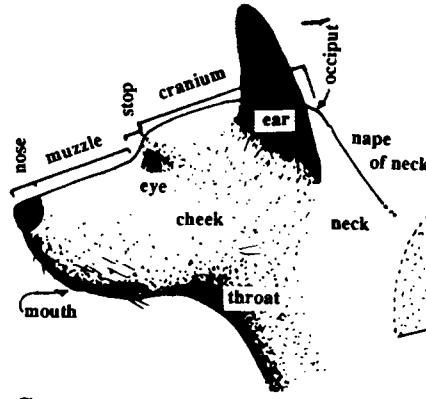
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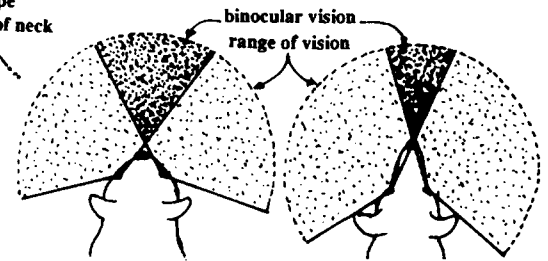
A WOLF
basic head - mesocephalic



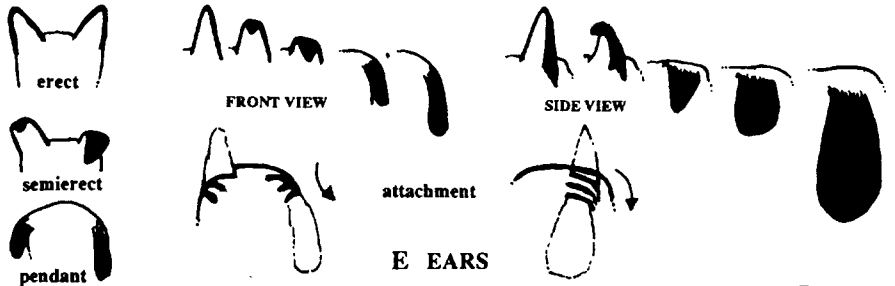
B SKULL



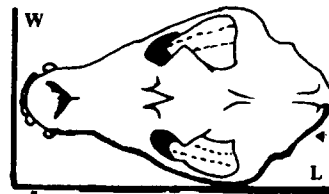
C MESOCEPHALIC HEAD



D VISION brachycephalic meso/dolicocephalic



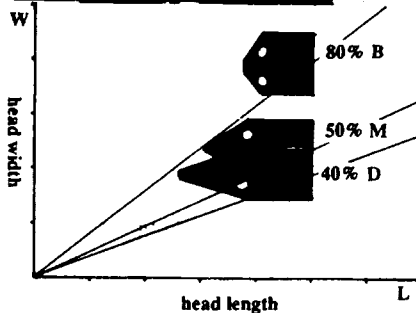
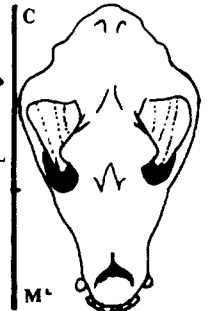
E EARS



NASO-CEPHALIC INDEX =

[D = 50%, M = 40%, B = 25%]

TOTAL CEPHALIC INDEX = $\frac{W}{L} \times \frac{100}{I}$



F PROPORTIONS

